

# Removal of an Intraperitoneal Foreign Body Using a Single Port Laparoscopic Procedure

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## ABSTRACT

**Background and Objectives:** To remove a foreign body from the peritoneal cavity in laparoscopic surgery, 2 or 3 ports are usually used. We have recently performed such a removal using a single 10-mm transumbilical port, a 0-degree laparoscope, a Farabeuf retractor, and a laparoscopic grasping forceps.

**Methods:** Two patients with ventriculoperitoneal shunt catheter (V-P shunt) were admitted to our unit during the last year. They previously had a shunt catheter implanted for hydrocephalus of unknown cause. The complete migration of the ventriculoperitoneal shunt catheter into the peritoneal cavity was observed in these patients 12 and 7 years after the implantation. The laparoscopic removal of the migrated catheter was decided on. Its presence and location were confirmed by the use of a 0-degree laparoscope, through a 10-mm trocar port. The catheter was held and pulled out using a grasping forceps that was pushed in just beside the trocar port.

**Conclusion:** The laparoscopic approach enables safe removal of a foreign body in the peritoneal cavity. The procedure can be performed using a single port.

**Key Words:** Foreign body, Ventriculoperitoneal shunt, Laparoscopy, Peritoneal cavity.

## INTRODUCTION

The development of laparoscopic surgery is increasing, and it can be used nowadays for various diseases including digestive cancers. The advantages of using the laparoscopic approach, such as decreased postoperative pain, shorter hospital stay, earlier return to work, and cosmetic benefits, need no further proof.

A foreign body in the peritoneal cavity could appear even as a result of iatrogenic causes and, once detected, its removal is necessary as early as possible. Most surgeons agree that removal of a foreign body from the peritoneum is one of the best uses of laparoscopic surgery, because it is a simple procedure and has cosmetic advantages.

Laparoscopic removal of intraperitoneal foreign bodies has been reported using 2 or 3 trocar ports 10mm or 12mm in diameter.<sup>1,2</sup> The use of a single trocar for the same purpose with a flexible cholangioscope has also been reported.<sup>3</sup>

The primary treatment of hydrocephalus is ventricular shunt placement. The ventriculoperitoneal (V-P) shunt is the most commonly used type, because the peritoneum is an efficient site of absorption. Migration of the shunt catheter into the peritoneal cavity may occur as a complication of shunt placement. Our report concerns the safe and successful removal of a completely migrated ventriculoperitoneal (V-P) shunt catheter from the peritoneal cavity, by using a single 10-mm port, a 0-degree laparoscope, a Farabeuf retractor, and a grasping laparoscopic forceps.

## MATERIALS AND METHODS

### Case 1

The patient was a 45-year-old female who complained mainly of irritability, abdominal discomfort, and nausea. She had a past history of acute appendicitis operated on 10 years earlier. Additionally, she had hydrocephalus of an unknown cause 12 years earlier. A V-P shunt catheter was implanted for the hydrocephalus.

The patient reported to us with a complaint of lower abdominal discomfort, nausea, and irritability. Clinical ex-

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amination on admission showed a blood pressure of 125/80mm Hg, a pulse of 76/minute, a body temperature of 36.6C, and a flat and soft abdomen with no tenderness.

The falling of the V-P shunt catheter into the abdominal cavity was suspected on plain abdominal X-ray (**Figure 1**). A CT scan was also performed, confirming the complete migration and the position of the catheter in the peritoneal cavity. No other abdominal findings or increased inflammation markers were observed.

The patient was referred to our surgical department for laparoscopic foreign body removal.

## Case 2

The patient was a 32-year-old male whose main complaints were headache, physical weakness, abdominal pain, and nausea. He had a past history of hydrocephalus of unknown cause (7 years earlier) and repeated upper respiratory tract infections. He underwent V-P drainage with a shunt catheter 7 years earlier.

Presently, because the patient complained of abdominal pain, a complete abdominal migration of the V-P shunt



**Figure 1.** Plain abdominal X-ray: the V-P shunt catheter inside the abdominal cavity.

catheter was suspected, and then confirmed on plain abdominal X-ray and CT scan (**Figure 2**). Clinical examination on admission showed a blood pressure of 115/75mm Hg, no fever, a flat and soft abdomen but with a relative tenderness with deep palpation. No significant change on laboratory tests was observed.

The patient was therefore admitted in our surgical unit for laparoscopic catheter removal.

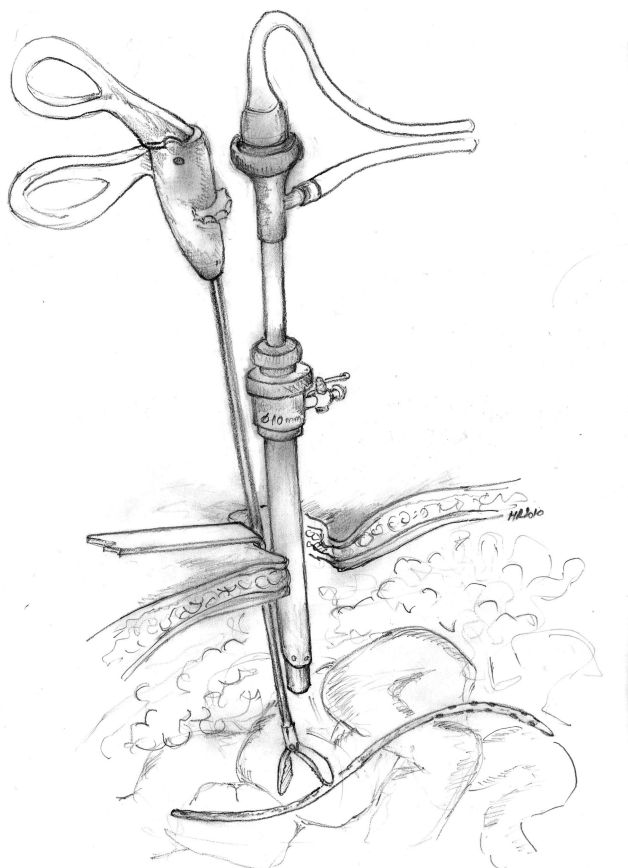
## METHODS

### Surgical Procedure

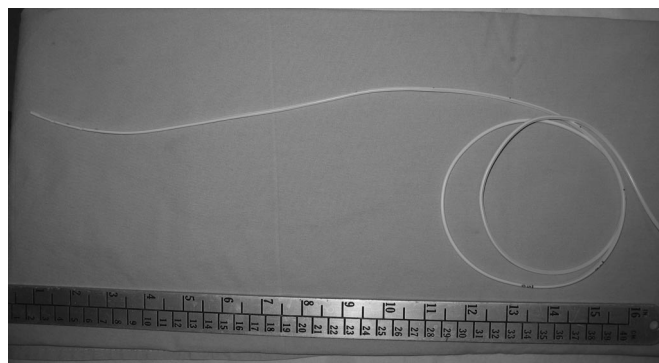
An open single-port laparoscopy was performed with the patient under general anesthesia. A 10-mm trocar port was inserted just above the umbilicus. We believe that the 10-mm trocar port incision is suitable to allow the introduction of a 5-mm grasping laparoscopic forceps just inside the trocar sleeve. Any other smaller incision would not have been effective for this purpose. The CO<sub>2</sub> pneumoperitoneum had been performed reaching 10mm Hg. Laparoscopy (only a 0-degree, 10-mm diameter laparoscope was available at the time of operation) revealed that a V-P shunt catheter had entirely slipped into the lower part of the peritoneal cavity. No adherence was noticed, in connection with the previous abdominal insertion operation. A Farabeuf retractor was inserted with its small blade through the slightly enlarged trocar incision, just inside the trocar sleeve (ensuring lifting of the abdominal wall) and then a grasping 5-mm laparoscopic forceps was pushed in between, into the abdominal cavity (**Figure 3**). The shunt catheter was held under laparoscopic vision and removed by the grasping forceps (**Figure 4**). The



**Figure 2.** Abdominal CT: the V-P shunt catheter located in the lower abdomen.



**Figure 3.** Our simplified single-port laparoscopic technique: the position of the Farabeuf retractor, grasping forceps, and laparoscope.



**Figure 4.** The removed V-P shunt catheter.

Farabeuf retractor ensured “laparo-lifting” during the catheter removal, whereas a certain decrease in abdominal CO<sub>2</sub> pressure was unavoidable, as a result of a partial gas leak inside the instruments. Thus, we almost used a “partially gasless” laparoscopic procedure.

## RESULTS

Operation time was about 10 minutes, the postoperative course was uneventful, and the patients were discharged the next day.

## DISCUSSION

We report herein 2 cases of laparoscopic removal using only one trocar port of a V-P shunt catheter that had migrated completely into the peritoneal cavity. Since laparoscopic cholecystectomy was first performed in 1987, indications for laparoscopic surgery have rapidly expanded even for use in malignant gastrointestinal diseases. Laparoscopic removal of a foreign body from the abdominal cavity is now being performed routinely.

Intraperitoneal foreign bodies are sometimes related to iatrogenic acts, such as dialysis catheters, intrauterine devices, and drainage tubes.<sup>1,4,5</sup> Fujiwara et al<sup>5</sup> classified the 4 routes of entry of a foreign body into the peritoneal cavity as<sup>1</sup> percutaneous,<sup>2</sup> penetration after swallowing, either by accident or intentionally,<sup>3</sup> iatrogenic after surgery or examination,<sup>4</sup> and transvaginal. In cases of penetration after swallowing, the foreign bodies were fish bones, needles, or other pieces of metal.<sup>6</sup> Frequently, the patients are infants or have mental problems. In iatrogenic conditions, the most common materials found are drainage tubes and V-P shunt catheters that have migrated.

The primary treatment for hydrocephalus is ventriculo-peritoneal shunt placement. It is the most commonly used type, because the peritoneum is an efficient site of absorption. Modern V-P-shunts contain several components, usually including a proximal ventriculostomy catheter, a pressure sensitive valve and reservoir, and a distal peritoneal catheter. The distal catheter segment can migrate to a wide variety of sites, such as the peritoneal cavity, thorax, abdominal wall, and scrotum.<sup>7</sup>

As has usually been reported, 3-mm or even more, 10-mm or 12-mm trocar ports have been inserted for laparoscopic removal of intraperitoneal foreign bodies.<sup>1,2</sup>

However, the use of a single trocar for the same purpose, with a flexible cholangioscope, has already been reported. Kurita et al<sup>3</sup> removed a V-P shunt catheter that had fallen completely into the peritoneal cavity by using a single trocar.<sup>3</sup> Ueno et al<sup>8</sup> reported laparoscopic removal in Japan of drainage tubes that had slipped into the peritoneal cavity after abdominal surgery, by using a rigid 10-mm scope, with an operative channel and a biopsy forceps. The above-mentioned techniques resemble our

procedure, as far as the use of a single laparoscopic port is concerned.

We have previously used this simple technique within single-port transumbilical laparoscopic-assisted appendectomies that we have performed in some pediatric and thin young patients.

As described above, our method needs no other endoscopic device, apart from the 0-degree, 10-mm laparoscope; therefore, it is more accessible and cost effective. Although it would have been useful for even better visualization, no angled laparoscope was available at the time of the interventions. Also, no smaller size laparoscope (5mm or 3mm) has been available in our unit so far. We consider that a 10-mm transumbilical incision for single-trocar port insertion is the most appropriate to allow the introduction of a 5-mm laparoscopic grasping forceps and of a small blade retractor. The drawback of the procedure is the loss of tightness in the abdominal CO<sub>2</sub> pressure, resulting in partial gas leakage near the trocar port and the other instruments during the procedure. Nevertheless, use of the Farabeuf retractor for laparo-lifting ensures the good progression of catheter removal under laparoscopic vision. From this point of view, our technique is actually a partially “gasless” laparoscopic procedure rather than one using low CO<sub>2</sub> pneumoperitoneum pressure.

Laparoscopy is certainly one of the best approaches for removing foreign bodies from the abdominal cavity, thanks to its safety, simplicity, minimal invasiveness, and cosmetic advantages. Moreover, laparoscopic removal of

an intraperitoneal foreign body by using a single trocar port appears to be a safe, simple, and cost-effective minimally invasive surgical method.

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